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ABSTRACT

The philosophical overview which introduces this review of the literature on audiovisual instruction concentrates on the historical background of the field and its place within the broader fields of communication, education, and communication theory and research. A selected bibliography is provided for the major areas in instructional technology: history and philosophy of the audiovisual movement, organizations and periodicals, instructional and learning theory, communications theory, systems, research, texts and teaching materials, production of audiovisual material, instructional television and film, programed instruction, computer-assisted instruction, simulation, learning laboratories, administering media programs, equipment and facilities, and media indexes. A brief introduction to each of these topics serves as annotation. (JY)

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A GUIDE TO THE LITERATURE

ON AUDIOVISUAL INSTRUCTION

By Edgar Dale and John Belland
The Ohio State University

With Introduction and Overview
By Edgar Dale

Issued by the ERIC Clearinghouse
on Media and Technology
Stanford, California 94305

In September 1971

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The Literature on Audiovisual Instruction

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INTRODUCTION AND OVERVIEW

The field of instructional technology is in flux. The concept of "audiovisual" instruction itself is inadequate in view of new demands and new technological developments. Further, the idea of the film, the filmstrip, the recording, the photograph etc. as "aids," as supplements, is being critically reviewed. In an instructional system all experiences are seen as integrative, synergetic, complementary–not supplementary. It is significant that the Department of Audiovisual Instruction has changed its name to Association for Educational Communications and Technology. The terms "system," "technology," and "communication" loom large in our current thinking.

It is now in the mode to say that all students have individual learning styles and that instructional materials must take this into account. While there is an element of individuality in all learning, we do not yet know enough about these styles to assume that we can or need to develop individualized programs to fit each learner. Further, there are many activities which should not be individualized in the narrow sense of that term but should indeed be socialized, thus providing growth through group activity. The term "tailor-made" instruction can be used to include both individual and group instruction. For example, in group sports the students learn to play both as members of a team and as individual specialists–passing, blocking, kicking field goals, etc.

Obviously it is much easier to develop a learning system for football than it is for critical and creative thinking. It is no wonder, therefore, that football instruction has been modernized in a way that the teaching of thinking has not been. Today we not only have head football coaches but coaches for the line, the backfield, for all the skills of football. These coaches use varied instructional materials. Coaches do not think of films, simulation, or the chalkboard as aids but as an essential, integrated part of the learning process.

Further, the skills of football, swimming, or golf are predictable. The criteria for measuring success are clear–you win the game or you don't. There are important concomitant learnings of sportsmanship, of leadership, which loom much larger when the team is losing. But the skills of thinking–and we hesitate to use the word skill in this connection–are not easily defined, nor is the route to their successful mastery quite clear.

1. The Historical Background

Today's strong and insistent call for relevant, meaningful education is quite familiar to specialists in educational communications and technology. We have invoked the names of Erasmus, Comenius, Rousseau, Dickens, Dewey and others, all of whom were sharply critical of the meaningless verbalism of our schools.

We have pointed out over the years that symbolic communication uses a triad of media: reading and writing, speaking and listening, visualizing and observing. We have noted the importance of new media–the film, the recording, drawings and photography, radio and television, the computer, simulation. We have called for a wider and more intelligent use of

our museum resources, tying them more closely to instruction in schools and colleges.

This movement has not received the attention from educational philosophers and historians that it deserves. Even one of our ablest educational historians, Lawrence A. Cremin, in *The Transformation of the School,* does not treat such terms as communication, media, materials of instruction, simulation, radio and television, textbook, thinking, verbalism. One major exception is his treatment of the introduction of manual training into the schools, and another is his treatment of agricultural demonstrations. The writers believe that the transformation of the school cannot be achieved unless there is critical concern with the materials of instruction. Here, we believe, lies a significant part of the coming revolution in education.

2. The Concrete-Abstract Continuum

The process of education is basically that of the development and discriminating use of concepts. We have concepts of ourselves, of our values, of what other people are like. Our concepts may be meager or rich, provincial or cosmopolitan. We conceptualize by seeing differences in likeness and likeness in difference. Concepts may be placed on a continuum or scale from concrete to abstract. We have recognized that conceptual development is not only a movement from concrete to abstract, but one of concrete to abstract to concrete, a continuing interaction between the two.

Writers in the field of educational communication and technology have used various models, analogies, or metaphors to represent this scale. All share the idea that concepts will range on a scale from rich, direct, first-hand sense experiences to those which are highly symbolic. The continuum moves from the tangible—the seen, heard, felt, touched sense experience—to the intangible, the highly symbolic, the "desensed" experience.

However, lying between the tangible concrete and the intangible abstract is an area with which the communications specialist is deeply concerned. It is the semi-concrete experience, the experience which bears some similarity or resemblance to the original object, event, person, or place.

James Q. Knowlton has defined *audiovisual communication,* in its role as a potential scientific discipline, as "designating that part of the broad field of education concerned with the study of pictorial (and other iconic or analogic) messages as these bear upon the learning . . . process."[1] An icon is an image, a picture. An analogy is something that is like something else; it bears a partial resemblance.

The student of communication, says Knowlton, will study two different kinds of messages—the verbal which do not look like or resemble the things for which they stand, and the pictorial (iconic) messages—those which directly remind us of the things for which they stand. He notes, too, that the messages which partially resemble the idea for which they stand may be physical models, music, and onomatopoetic (like buzz, whiz, sizzle, etc.) words.

Brown and Thornton discuss the special suitability of new media to carry iconic messages:

> Motion pictures, television, and some other media are particularly well suited to the transmission of pictures or other sensory replications of objects, persons, events, and scenes as they would appear "in real life" to an observer at the place of origin. Such presentations, messages, or materials have been described variously as nondiscursive, analogical, or iconic. By whatever name it is called, an iconic sign is one that bears some resemblance to the object it represents. *A strong case can be made for the point of view that the iconic sign, and its peculiar function in communication, is the focal and truly distinguishing characteristic of the new media as a group.*[2] [italics added]

3. The Field of Communication

The sharp increase in new media and the need for their integration into effective educational patterns has led to a shift away from a narrow audiovisual approach to one which concerns itself more broadly with the use of all appropriate media in systematic programs of education.

We are making increased use of instructional television, computer assisted instruction, and varied forms of programmed instruction. Public Television as contrasted with commercial television is playing a more dominant role in the education of the public as a whole. The production of "Sesame Street" is an example.

While we may not accept McLuhan's dictum that "the medium is the message," nevertheless we realize that the medium and the message are closely interrelated. Further, we see that message systems relate to communication through reading and writing, speaking and listening, visualizing and observing. Hence we no longer think of audiovisual materials as an appendage to a curriculum–like frosting on a cake–but rather as integral and the working parts of a carefully formulated program of planned educational experiences.

We see this reflected in the modern curriculum developments in foreign languages, mathematics, physics, chemistry, geography and elementary reading, which aim for an integrated use of varied materials such as films, filmstrips, videotapes, recordings in cassettes, picture study prints, exhibits, demonstrations, and many others. Further, these integrated materials increasingly are tried out experimentally and weaknesses corrected on the basis of feedback from the learner. The methods and utilization of programmed instruction are still under careful study, but it is clear that audiovisual materials will occupy an important role as a part of the programmed message system.

There is still a place for the single film recording, filmstrip, set of charts. They will always be a part of the repertoire of learning materials used by the versatile teacher. There will always be individualized use of audiovisual media to make a point, to underline a generalization, to open up a new field of study. Film and magnetic tape cassettes will profoundly affect the individualization of instruction.

Basically the audiovisual specialist of the future will be media-message oriented, sensitive to message-systems, proficient in ways of selecting, utilizing, evaluating, and producing message systems. While his focus will be on concrete and semi-concrete experiences–doing and picturing–he will still be mindful that the symbols of print are often a necessary part of an effective audiovisual message. To the discriminations involved in the literacy of reading, we now add the literacy needed to interpret sounds and pictures which together express a unified message. In effective teaching and learning, then, we are concerned with the literacy of reading, listening, and viewing. This extension of communication methodologies will have a fundamental effect on future instruction.

4. The Educative Environment

Experiential deprivation of all kinds is a concern of the communication specialist. There is poverty of first-hand experience as well as material poverty, and they may be closely connected. The critical importance of the years *before* formal school begins is increasingly recognized. Since this is largely a pre-reading stage in the life of the child, his first-hand and iconic experiences become highly important.

Benjamin S. Bloom has noted that:

> The absolute scale of vocabulary development and the longitudinal studies of educational achievement indicate that approximately 50% of general achievement at grade 12 (age 18) has been reached by the end of grade 3 (age 9). This suggests the great importance of the first few years of school as well as the preschool period in the developing of learning patterns and general achievement.[3]

Hence the concern with the mass media—photographs, drawings, movies, television, visual displays—the image building experiences of the home and community. The child who is read to, who examines picture books, who has had rich audiovisual experiences, is a better reader than one who has been deprived of these experiences. Research studies of the good and harmful effects of theatrical films and television on children and youth leave no grounds for complacency.

For example, we do not build habits of reason and judgment by glorifying unreason and violence on the screen. If we cannot easily change the presented stimuli, we can certainly change the responses. There is need, therefore, for life-long education in habits of discrimination in viewing, listening and reading. Public libraries, now picture-minded as well as book-minded, are increasingly providing recordings and films as well as books. Critical thinking relating to the media becomes an important objective of instruction.

A major development is now under way in the instructional resources center, also called the learning center. Such centers provide easy access not only to printed material but also to varied audiovisual resources as well. As schools move toward developing the independent learner, toward self-instruction, the furnishing of a wider variety of materials of instruction is imperative. This may mean dial access to films, videotapes, filmstrips, recordings, and other learning experiences. For example, the library system at The Ohio State University has now been computerized, making access to its volumes easily arranged by a telephone call.

Sometimes the learning center will provide materials geared to individual or local needs. Some centers will provide facilities for the production of materials of instruction. Learning centers may also furnish self-testing experiences, with learning materials available to meet the weaknesses disclosed. We are beginning to take continuing education seriously. We are nearing the time when an individual may go to an easily available computer terminal and take diagnostic tests of his competencies in varied fields. The computer will provide a "read-out" of strengths and deficiencies, and note or actually supply (if in a library) needed books, films, recordings, and other study materials.

5. Communication Theory and Research

Communication theory and research have increasingly engaged the attention of educators, political scientists, sociologists, economists, linguists, public opinion specialists, and others. Many of the problems of government are problems of public opinion. Caste and class profoundly influence communication. Semantics and syntax are key factors in communicating through language. There is silent, nonverbal language as well as spoken language. We have such terms as "expressive silence," "the silence was deafening," "silence gives consent," "listening to silence," and "well-timed silence."

John Dewey was deeply concerned with the process of communication. One can find his references to communication under that topic and also under meaning, symbols, language, media, words, concept, symbol. He was concerned with such barriers to communication as external dictation and lack of democracy. He saw the good life as a daily renewal or reconstruction of one's experiences. He contrasted "immediate, direct experience, in which we take part vitally and at first hand" with experiences gained through the intervention of representative media. He speaks of the need for "the intervention of agencies for representing absent and distant affairs" noting that without them "our experience would remain almost on the level of that of the brutes. Every step from savagery to civilization is dependent upon the invention of media which enlarge the range of purely immediate experience."[4] He speaks of a cultured man as one who has extended the range and depth of his perceptions. Modern media of communication clearly provide this "mediated" approach and we can expect a sharp rise in their use.

Footnotes

1. James Q. Knowlton, "A Conceptual Scheme for the Audiovisual Field," p. 5, *Bulletin of the School of Education,* Indiana University, Vol. 40, No. 3 and reprint.

2. James W. Brown and James W. Thornton, "The New Media in Higher Education: A Rationale," *New Media in Higher Education,* Washington, D.C.: NEA, 1963.

3. Benjamin S. Bloom, *Stability and Change in Human Characteristics,* Wiley, New York, 1964, p. 127.

4. John Dewey, *Democracy and Education,* The Macmillan Company, New York, 1916.

BIBLIOGRAPHY

This is a selected bibliography intended to guide an introductory inquiry into this broad field or enable one to explore facets of the field previously ignored. The criteria used in the selection were 1) timeliness, 2) some unique element and, 3) availability. Bibliographies and published materials in non-print media were included where feasible.

History and Philosophy of the Audiovisual Movement

In the last several years, many books have been published which purport to give an overview of the field variously called audiovisual instruction/education, educational/instructional media, educational/instructional communications, or educational/instructional technology. Most have been books of readings gathered by the editors from periodicals and other previously published sources. As is appropriate in any field, but especially in one changing so rapidly, it is important to read widely, analyzing the various points of view.

Saettler (1968) has given this field its only comprehensive historical treatment. He has generally traced the evolution of the ideas and the research related to the design and use of various media forms in the educational process.

Wilman and Meierhenry (1969) have edited together a set of chapters commissioned from important scholars in the various aspects of media and technology. They have included considerable theoretical material which should provide the basis for thinking about educational technology from the point of view of learning and the learner.

Sources:

M. J. Apter, **The New Technology of Education**, Macmillan & Co., Ltd., Little Essex St., London WC2, England, 1968, $1 50.

J. Brown and J. Thornton, eds., **New Media in Higher Education**, Department of Audiovisual Instruction (now Association for Educational Communications and Technology), National Education Association, 1201 16th Street, Washington, D.C. 20036, 1963, but now out of print.

Commission on Instructional Technology, **To Improve Learning**, U.S. Government Printing Office, Superintendent of Documents, Washington, D.C. 20402, 1970, Order No. 40-7150, 50c.

R. de Kieffer, **Media Milestones in Teacher Training**, Educational Media Council, Suite 618, DuPont Circle Bldg., 1346 Connecticut Ave., N.W., Washington, D.C. 20036, 1970, $3.00.

R. Heinich, **Technology and the Management of Instruction**, AECT Monograph No. 4, Association for Educational Communications and Technology, Publication Sales Section, National Education Association, 1201 16th St., N.W., Washington, D.C. 20036, 1970.

F. Knirk and J. Childs, **Instructional Technology—A Book of Readings**, Holt, Rinehart and Winston, Inc., New York, 1968, $6.25.

J. W. Loughary, **Man-Machine Systems in Education**, Harper and Row, New York, 1966. Out of print as of 1970.

P. Rossi and B. Biddle, **The New Media and Education; Their Impact on Society**, Anchor Books, New York, 1966, $1.95.

P. Saettler, **A History of Instructional Technology**, McGraw-Hill, 1968, $6.00.

D. Unwin, **Media and Methods: Instructional Technology in Higher Education**, McGraw-Hill, New York, 1969, $8.95.

R. Weisgerber, ed., **Instructional Process and Media Innovation**, Rand McNally and Co., Chicago, 1968, $7.75.

R. Wilman and W. Meierhenry, **Educational Media: Theory Into Practice**, Charles E. Merrill Pub. Co., 1300 Alum Creek Dr., Columbus, Ohio 43216, 1969, $7.50.

P. Witt, ed., **Technology and the Curriculum**, Teachers College Press, Columbia University, Teachers College, New York, 10023, 1968, $3.25.

Organizations and Periodicals

The principal organization devoted to concerns of media and communications in education is the Association for Educational Communications and Technology (known as the Department of Audiovisual Instruction, or DAVI, before 1971). It publishes the journals *Audiovisual Instruction,* devoted to relatively popular topics treated non-technically, and *AV Communication Review,* which reports research, reviews new literature, and publishes important conceptual statements.

The National Association of Educational Broadcasters is concerned primarily with radio and television. Since the advent of video recording, it has become less concerned with mass effects of media and with broadcasting *per se* and more interested in the personal effects of recorded audio and video presentations. It publishes the *Educational Broadcasting Review,* the *NAEB Newsletter* and the NAEB *Washington Report.*

The National Audio-Visual Association is an organization of manufacturers and dealers in audiovisual equipment. It publishes the annual Audio-Visual Equipment Directory.

The Educational Products Information Exchange publishes the *EPIE Educational Product Report.*

There are many other organizations of service to the instructional technologist. The American Educational Research Association, the National Society for Programmed Instruction, and the National Education Association's Division of Educational Technology are but a few examples.

Sources:

Educational Broadcasting Review, bi-weekly, annual subscription $6, National Association of Educational Broadcasters, 1346 Connecticut Ave., N.W., Washington, D.C. 20036. (From 1941-67 this was issued as the **NAEB Journal.**)

Educational Technology, monthly, annual subscription $18, Educational Technology Publications, Inc., 140 Sylvan Ave., Englewood Cliffs, N.J. 07632.

AV Communication Review, quarterly, annual subscription $13, Association for Educational Communications and Technology, AECT Publication Sales Section, National Education Association, 1201 16th St., N.W., Washington, D.C. 20036.

Audio-Visual Equipment Directory, annual, $8.50, National Audio-Visual Association, Inc., 3150 Spring St., Fairfax, Virginia 22030.

Audiovisual Instruction, 10 issues per year, annual subscription $12, Association for Educational Communications and Technology, AECT Publications Sales Section, National Education Association, 1201 16th St., N.W., Washington, D.C. 20036.

Educational Product Report, 9 issues per year, annual subscription $35, Educational Product Information Exchange, EPIE Institute, 386 Park Avenue South, New York, N.Y. 10016.

NAEB Newsletter, monthly, annual subscription including Membership $20, Nonmembers, $10, National Association of Educational Broadcasters (NAEB), 1346 Connecticut Ave., N.W., Washington, D.C. 20036.

NSPI Journal, 10 issues per year, annual subscription, $20 for non-members, $12.50 for members, National Society for Programmed Instruction, Trinity University, 715 Stadium Drive, San Antonio, Texas 78212.

AEDS Monitor, 10 issues per year, annual subscription $15 for non-members, $5 for members, Association for Educational Data Systems (AEDS), 1201 16th St., N.W., Washington, D.C. 20036.

Instructional and Learning Theory

The main body of knowledge which is of critical concern to practitioners of instructional materials design and utilization deals with learning and instruction. Of those two, instructional theory is the most directly applicable to design. Siegel and Siegel (1968) have addressed most of the current points of view, including writings from those who infer instructional process from studying learning and those who start with instruction.

Mager (1962), Bloom (1956), and Krathwohl (1964) provide insight into the stating and classifying of objectives. Gagné (1965) provides alternative means by classifying the type of learning required and then establishing conditions under which this learning could occur. Briggs (1968) has delineated a strategy for using Gagné's hierarchy.

Hilgard (1964), Smith and Smith (1966) De Cecco (1968), and Travers (1970) have described the various points of view related to learning. Travers has perhaps caused the most dissent among instructional designers by describing research indicating that human beings process information relatively slowly.

Sources:

B. S. Bloom, ed., **Taxonomy of Educational Objectives; The Classification of Educational Goals, Handbook No. 1: Cognitive Domain**, David McKay Co., 750 Third Ave., New York, N.Y. 10017, 1956, $6, Paperback, $1.95.

Leslie J. Briggs, Peggie L. Campeau, Robert M. Gagné and Mark A. May, **Instructional Media: A Procedure for the Design of Multi-Media Instruction, A Critical Review of Research, and Suggestions for Future Research**, American Institutes for Research, 135 North Bellefield Ave., Pittsburgh, Pa. 15213, 1967, $4.50. Also available from the ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Maryland 20014, in microfiche for 65c, in hardcopy for $9.87, as document ED 003 172.

Jerome Bruner, **Toward a Theory of Instruction**, W. W. Norton and Co., Inc., New York, 1966, $1.95.

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D. Krathwohl, B. Bloom, and B. Masia, **Taxonomy of Educational Objectives; Handbook No. 2: Affective Domain**, David McKay Co., 750 Third Ave., New York, N.Y. 10017, 1964, $2.50.

Robert F. Mager, **Preparing Instructional Objectives**, Fearon Publishers, Inc., 6 Davis Drive, Belmont, Calif. 94002, $3.50, paperback $1.75.

L. Siegel, ed., **Instruction: Some Contemporary Viewpoints**, Chandler Publishing Co., San Francisco, 1967, $8.

K. Smith and M. Smith, **Cybernetic Principles of Learning and Educational Design**, Holt, Rinehart and Winston, New York, 1966, $10.25.

R. Travers, **Man's Information System**, Chandler Publishing Co., San Francisco, 1970, $3.25.

Communications Theory

Since instruction involves communication, the various dimensions of communications theory are grist for the careful design of instruction. While Ball and Byrnes' (1960) compendium for agricultural extension workers remains a most useful source, the visual literacy movement is providing new insights (1970). Wagner's set of modular films (1966) addresses many of the concepts and issues in communication.

Sources:

J. Ball and Francis C. Byrnes, eds., **Research, Principles and Practices in Visual Communications**, Department of Audiovisual Instruction (now Association for Educational Communications and Technology), AECT Publication Sales Section, National Education Association, 1201 16th St., N.W., Washington, D.C. 20036, 1960, $4 (Order No. 071-02582).

Proceedings: 1st National Conference on Visual Literacy, Pitman Publishing Corp., 6 East 43rd St., New York, N.Y. 10017, 1970, $6.95.

R. Wagner, **A Galaxy of Motion-Picture Documents on Communications Theory and New Educational Media**, Ohio State University, Department of Photography and Cinema, Columbus, Ohio, 1966. Available from ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Maryland 20014, in microfiche for 65c, in hardcopy for $3.29, as document ED 010 528.

Systems

Systems refers to a generalizable approach to the design and management of organizations or processes. Much of the integrating of ideas which have made a comprehensive study of the instructional process possible has come through the development of systems ideas. Boguslaw (1965) has provided the vision of the holistic systems ideas while Churchman (1969) describes the methodology in generally understandable terms. Mager and Beach (1968) describe a general process for instructional development derived from systems notions. They apply the process to vocational instruction, but task-analysis possibly excepted, it is certainly valid for much instructional development.

First, the objectives are ascertained through a process of refining the vague goal

statements usually found in precise but not trivial behavioral statements. Second, these objectives are analyzed to determine sequence and prerequisites as well as to determine the way the terminal performance of the learner will be evaluated. Third, alternative instructional possibilities are delineated. These alternatives are evaluated in terms of cost and feasibility and one is selected to be developed. Fourth, the materials are produced and the facilities arranged. Fifth, the instructional process is field tested and student performance evaluated. Sixth, the evaluation information is compared with the objectives and effectiveness and revision decisions made.

Sources:

R. Boguslaw, **The New Utopians**, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1965, $2.45.

C. Churchman, **The Systems Approach**, Delta Books, Dell Publishing Co., New York, 1969, $2.25.

R. Mager and Kenneth M. Beach, Jr., **Developing Vocational Instruction**, Fearon Publishers, Inc., 6 Davis Drive, Belmont, Calif. 94002, $2.

Research

Allen (1971) has provided a valuable overview of the research tradition in instructional technology. Other general references are the 1960 and 1969 *Encyclopedia of Educational Research*, Lumsdaine (1963), the April 1962 *Review of Educational Research*, and the April 1968 *Review of Educational Research*. (Other research sources in specific media are reported in the sections dealing specifically with those media.)

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Loran C. Twyford, Jr., "Educational Communications Media," in **Encyclopedia of Educational Research**, MacMillan Co., New York, 1969.

Texts and Teaching Materials

For a field traditionally concerned with emphasizing alternatives to printed language communication, there are many texts intended to impart the basic wisdom of the field to pre- and in-service teachers as well as to beginning specialists in the instrumentation of instruction. These texts are becoming increasingly like reference works—they have glossaries, indexes, catalogs of sources, and manuals of techniques. Brown, Lewis and Harcleroad (1969) make an instructors' manual and a related student laboratory manual available which is keyed closely to the *Educational Media Kit* from the same publisher.

Gerlach and Ely (1971) have produced an introductory text which is markedly different from the others. It attempts to lead the reader into a systematic instructional-development process. An instructors' manual is also planned for this text.

Dale (1969) has developed and applied the abstract concrete conceptualization to current developments as well as to the organization of the more traditional audiovisual media. In simple terms, he develops a philosophy of instructional materials and methods.

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J. Kinder, **Using Audio-Visual Materials in Education**, American Book Co., New York, 1965, $3.75.

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C. Williams, **Learning From Pictures**, 2nd Ed., Department of Audiovisual Instruction (now Association for Educational Communications and Technology), AECT Publication Sales Section, National Education Association, 1201 16th St., N.W., Washington, D.C. 20036, 1968, $4.50 (Order No. 071-02356).

C. Williams, **Sources of Teaching Materials**, Ohio State University Publications, Columbus, Ohio, 1971, $3.

W. Wittich and C. Schuller, **Audio-Visual Materials: Their Nature and Use**, Harper and Row, New York, 1967, $11.95.

Production of Audiovisual Materials

The books listed below emphasize techniques which could be used by teachers and building-level coordinators in local production. Most of the concern is with visual materials. The Kodak pamphlet is useful for teachers producing Super-8 motion pictures.

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Instructional Television and Film

McLuhan would be distressed to see instructional television and film grouped together, but the research to date has been unable to substantiate his contention that those media transform the message in unique ways. Dubin and Hedley (1969) provide an example of post-McLuhan research in television which does not seem to give a view much different from that expressed by the classic film research summary by Hoban and Van Ormer (1970 reprint of 1950 document) or by Reid and MacLennan (1967). On most cognitive variables, researchers have been unable to measure any difference in learning when instruction was presented in different media. Writers have often gone on to infer that there was no difference, a classical *non sequitur*.

Both motion pictures and television have been studied as mass media. With the coming of age of the eight millimeter film cartridge and the impending avalanche of television cartridges or cassettes, both of these forms will be used in increasingly individual ways. The literature has not yet caught up with this notion.

Sources:

Godwin C. Chu and Wilbur Schramm, **Learning from Television: What the Research Says**, Institute for Communication Research, Stanford University, Stanford, Calif., 1967. Available from the ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Md. 20014, in microfiche for 65c, in hardcopy for $9.87 as document ED 031 926. Also available for $3.50 from the National Association of Educational Broadcasters, 1346 Connecticut Ave., N.W., Washington, D.C. 20036.

Robert M. Diamond, ed., **A Guide to Instructional Television**, McGraw-Hill, New York, 1964, $8.95.

R. Dubin and R. Hedley, **The Medium May Be Related to the Message**, Center for the Advanced Study of Educational Administration, Eugene, Ore., 1969. Available from ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Maryland 20014, in microfiche for 65c, in hardcopy for $6.58, as document ED 031 926.

Film Evaluation Guide, 1946-1965, Educational Film Library Association (EFLA), 17 West 60th Street, New York 10023, 1965, $30.

Supplement to Film Evaluation Guide, 1965-1967, Educational Film Library Association (EFLA), 17 West 60th Street, New York 10023, 1968, $12.

Supplement to Film Evaluation Guide, 1967-1970, Educational Film Library Association (EFLA), 17 West 60th Street, New York 10023, 1971, $12.

J. Gay-Lord, **Instructional Television–A Utilization Guide for Teachers and Administrators**, Virginia State Department of Education, Richmond, Va. (no date). Available from the ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Md. 20014, in microfiche for 65c, in hardcopy for $3.29, as document ED 017 182.

Charles Hoban and E. van Ormer, **Instructional Film Research**, 1918-1950. Reprinted by Arno Press, New York, 1970, $8.

A. Koenig and R. Hill, eds., **The Farther Vision**, University of Wisconsin Press, Madison, Wisconsin, 1967, $7.50.

Mark A. May and A. A. Lumsdaine, **Learning From Films**, Yale University Press, New Haven, Conn., 1958 (o.p.).

J. Murphy and R. Gross, **Learning by Television**, The Fund for the Advancement of Education, Ford Foundation, New York, N.Y., 1966. Available from the ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Md. 20014, in microfiche for 65c, in hardcopy for $3.29, as document ED 012 622.

J. Reid, Donald W. MacLennan and Leslie P. Greenhill, **Research in Instructional Television and Film**, U.S. Government Printing Office, Washington, D.C. 20402, 1967, as document OE-34041, $1.25.

Wilbur Schramm, ed., **Educational Television: The Next Ten Years**, Institute for Communication Research, Stanford University, Stanford, Calif., 1962. Available from the ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Maryland 20014, in microfiche for 65c, in hardcopy for $13.16, as document ED 003 729.

David L. Parker, **A Filmography of Films about Movies and Moviemaking**, Revised Ed., Eastman Kodak Co., Consumer Markets Division, Department 454, 343 State Street, Rochester, N.Y. 14650, 1968, Order No. T-26, 35c.

Programmed Instruction and Computer-Assisted Instruction

These two areas should not be thought of as two parts of the same medium any more than instructional television and instructional motion pictures are considered to be the same. Yet they both make provision for highly individual and independent instructional experiences.

Zinn and staff in their ERIC at Stanford document (1970) and Hickey (1968) provide a comprehensive overview of the use of computers in instruction. This field is changing so rapidly, however, that it will continue to be difficult to really express the state of the art.

Programmed instruction is now post-panacea and some sensibility is being applied both in thinking about programming and in applying programs in instruction. Lange (1967) provides a broad view of the conceptualization. He edited and combined chapters from Corey, Dale, Markle, Deterline, Lindvall and others. Pipe (1966) gives an efficient introduction to actually writing programs.

Sources:

Jack V. Edling, A. Goshay, J. Ginther, J. Herbert, Wilbur Schramm and H. Thelen, **Four Case Studies of Programmed Instruction**, Fund for the Advancement of Education, Ford Foundation, 477 Madison Ave., New York 10022, 1964.

C. Hendershot, **Programmed Learning: A Bibliography of Programs and Presentation Devices**, 4th ed., Hendershot Programmed Learning Consultants, 4114 Ridgewood Dr., Bay City, Michigan 48706, 1967, $11.50, with supplements through 1970, 2 vols., $27.00.

A. Hickey, **Computer-Assisted Instruction: A Survey of the Literature**, 3rd ed., ENTELEK, Inc., 42 Pleasant St., Newburyport, Mass. 01950, 1968, $8.

P. Lange, ed., **Programed Instruction: NSSE Yearbook–Part II**, National Society for the Study of Education, University of Chicago Press, Chicago, 1967, $5.

P. Pipe, **Practical Programming**, Holt, Rinehart and Winston, Inc., New York, 1966, $1.95.

Selection and Use of Programmed Materials: A Handbook for Teachers, Division of Audiovisual Instruction (now Association for Educational Communications and Technology), AECT Publication Sales Section, National Education Association, 1201 16th Street, N.W., Washington, D.C. 20036, 1964, 50c, with filmstrip $5.

Karl L. Zinn and Susan McClintock, **A Guide to the Literature on Interactive Use of Computers for Instruction**, 2nd ed., ERIC at Stanford, Stanford, Calif. 94305, 1970, free.

Simulation

Simulation has been used to mean many different things, but basically a simulation is a dynamic model. It may be used as an instructional process, and when it involves competition among the participants it is called simulation gaming. Raser (1969) looks at the broad implications of simulation while Tansey and Unwin (1969) sort out some of the educational possibilities. Twelker (1970) provides a bibliography both of literature on simulation and gaming and of actual simulation materials.

Sources:

J. Raser, **Simulation and Society; An Exploration of Scientific Gaming**, Allyn and Bacon, Inc., Rockleigh, N.J. 07647, 1969, $2.95.

P. Tansey and D. Unwin, **Simulation and Gaming in Education**, Methuen Educational Ltd., 11 New Fetter Lane, London, EC4, 1969, $5.

P. Twelker, **A Basic Reference Shelf on Simulation and Gaming**, a Series One paper from ERIC at Stanford. Available from ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Maryland 20014, in microfiche for 65c, in hardcopy for $3.29, as document ED 041 487, and free while supply lasts from ERIC at Stanford, Stanford, Ca. 94305.

Learning Laboratories

The language laboratory has now been used to provide a variety of auditory and audiovisual instructional experiences. Many of these facilities have been renamed, as listening centers, learning labs, or audio-tutorial labs. Many of these laboratories use a switching mechanism to connect each booth to the program source, using telephone-like dials or buttons to select the program. Hocking (1964) comprehensively treats this type of facility from the language context. Postlethwait (1969), a botanist, presents a view of laboratories providing tutorial experience.

Sources:

E. Hocking, **Language Laboratory and Language Learning**, Department of Audiovisual Instruction (now Association for Educational Communications and Technology), AECT Publication Sales Section, National Education Association, 1201 16th St., N.W., Washington, D.C. 20036, 1964, $4.50 (Order No. 071 02642).

S. Postlethwait, J. Novak, and H. Murray, Jr., **The Audio-Tutorial Approach to Learning, Through Independent Study and Integrated Experiences**, 2nd ed., Burgess Publishing Co., 426 South 6th St., Minneapolis, Minn. 55415, 1969, $4.75.

Administering Media Programs

Brown and Norberg (1965) and Erickson (1969) have provided a conceptualization for organizing and managing traditional media service programs. Erickson has provided considerably more detailed guidance, but Brown and Norberg deal with the essential elements and point up issues.

A recent strategy for providing media services both to teachers and to students is the instructional materials center or learning resources center. Most of the literature has appeared in journals, but Pearson and Butler (1969) have collected a representative section from this literature.

Sources:

J. Brown and K. Norberg, **Administering Educational Media**, McGraw-Hill Book Co., New York, 1965, $8.95.

C. Erickson, **Administering Instructional Media Programs**, Macmillan Co., New York, 1969, $16.95.

N. Pearson and L. Butler, **Instructional Materials Centers, Selected Readings**, Burgess Publishing Co., 426 South 6th St., Minneapolis, Minn. 55415, 1969, $6.

Equipment and Facilities

Audiovisual equipment is constantly changing, so it is difficult to master equipment operation unless the principle of operation can be learned and applied on each new model of a given type. Eboch (1968) has used this idea without becoming so generalized as to be incomprehensible.

One obvious source for such instruction should be the manufacturer of the machine, but the materials either posted on the machine or included with it have usually required some prior technical knowledge and experience. To date, the most successful training on equipment operation has been the "one-to-one," or small-group tutorial, or an instructional program specifically designed both for the machine and the type of learner and instructional setting.

There is a trend toward publications which provide consumer information about audiovisual equipment. These have largely been unsatisfactory because of the widely varying conditions under which educational users operate. The testing and evaluation may be valid for one user and not another. Apprenticeship and internship with knowledgeable equipment purchasers seems to be the most valuable source of consumer information.

A critical area in the utilization of educational technology is facilities planning. Educational Facilities Labs (1970), the Department of Audiovisual Instruction (1966), and the joint effort of the American Library Association and the Department of Audiovisual Instruction (1969) have provided some help in this area. Given the potential of rapid change, the facility must be kept flexible without becoming so generalized in function that no one function can be adequately housed. Extended, serious debate with architects and other school personnel usually is required to find that compromise.

Sources:

Standards for School Media Programs, 1969, American Library Association, 50 Huron Street, Chicago, Illinois 60611 or National Education Association, 1201 16th St., N.W., Washington, D.C. 20036, $2. Also available in microfiche from the ERIC Document Reproduction Service, P.O. Drawer O, Bethesda, Md. 20014 for 65c, as document ED 033 616.

C. Eboch, **Operating Audio Visual Equipment**, 2nd ed., Chandler Publishing Co., San Francisco, 1968, $2.95.

Raymond L. Davidson, **Audio Visual Machines**, International Textbook Co., Scranton, Pa. 18515, 1969, $6.

Educationai Facilities with New Media, Department of Audiovisual Instruction (now Association for Educational Communications and Technology), AECT Publication Sales Section, National Education Association, 1201 16th St., N.W. Washington, D.C. 20036, 1966, $4.50 (Order No. 071-02302).

Instructional Hardware/A Guide to Architectural Requirements, Educational Facilities Laboratories, 477 Madison Avenue, New York, N.Y. 10022, 1970, free.

"Media's Influence on School Design," **Audiovisual Instruction**, Vol. 10, No. 2 (Feb. 1965), entire issue.

Stanton C. Oates, **Audio Visual Equipment–Self Instruction Manual**, 2nd ed., Wm. C. Brown Book Co., 135 South Locust St., Dubuque, Iowa 52001, 1970, $3.95.

F. Pula, **Application and Operation of Audiovisual Equipment in Education**, John Wiley and Sons, Inc., New York, 1968, $7.95.

R. Wyman, **Mediaware; Selection, Operation & Maintenance**, Wm C. Brown Book Co., 135 South Locust St., Dubuque, Iowa 52001, 1969, $3.75.

Indexes

It is becoming easier to locate commercially produced instructional materials. The NICEM indexes are organized by medium. The Westinghouse *Learning Directory* is organized by subject. With computerized printing there is some hope that these can remain current.

Sources:

Index to 16mm Educational Films, 2nd ed., The National Information Center for Educational Media, R. R. Bowker Co., New York, 1969, $39.50.

Index to 35mm Educational Filmstrips, 2nd ed., The National Information Center for Educational Media, R. R. Bowker Co., New York, 1970, $34.

Index to Overhead Transparencies, National Information Center for Educational Media, R. R. Bowker Co., New York, 1969, $22.50.

Learning Directory 1970-71, 7 volumes, Westinghouse Learning Corporation, New York, N.Y., $90.

John A. Moldstad, **Sources of Information on Educational Media**, U.S. Government Printing Office, Superintendent of Documents, Washington, D.C. 20402, 1963, as document OE-34024.

National Audio Tape Catalog, Department of Audiovisual Instruction (now Association for Educational Communications and Technology), AECT Publication Sales Section, National Education Association, 1201 16th Street, N.W., Washington, D.C. 20036, 1967, $3 (Order No. 071-02836).

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